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Research Article

**INFLUENZA VACCINATION AMONG ALGERIAN HAJJ  
PILGRIMS: UPTAKE, ATTITUDES, AND BARRIERS**

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**Abstract**

*The study aims to evaluate the uptake, attitudes and barriers of influenza vaccine among Algerian Hajj pilgrims. A cross-sectional survey was conducted on Algerian Hajj pilgrims who were the residents of Makah city. A cross-sectional survey was conducted on Algerian pilgrims who were the residents of Makah city during 23<sup>rd</sup> August 2016 till 23<sup>rd</sup> September 2016 at the time of Hajj. The survey was conducted on pilgrims who were residents of Makah city. Following a short briefing regarding study, verbal consent was obtained from each participant who agreed to participate in the survey. Moreover, knowledge about Corona virus was assessed by using (KAP) questionnaire. Data about Pilgrims' demographics, previous Hajj attendance and history of chronic medical conditions was collected. Pilgrims were to complete the survey through interviews conducted by the data collection teams. Lastly, ethical approval was obtained from Zamzam charity research center. Results reported low level of awareness among Algerian Hajj pilgrims, insignificant relationship between education level and influenza vaccination and availability of low resources for spreading the awareness of influenza vaccine. There is a low level of awareness and knowledge among pilgrims regarding the vaccination of influenza. Moreover, there are very few resources available that gives the knowledge of influenza. Lastly, even those participants who were educated consisted of low level of knowledge regarding influenza vaccination. Thus, insignificant relationship exist between knowledge of influenza vaccination and education level. Thus, Saudi government and other stakeholders need to play their roles to increase awareness among pilgrims regarding influenzas vaccine.*

**Keywords:** Influenza, Vaccine, Hajj, Algerian Pilgrims, Saudi Arabia.

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## INTRODUCTION:

Hajj is the largest annual mass gathering in the world, around two and half million pilgrims from 180 countries travel to Makah to perform this sacred ritual. However, the pilgrims travelling to perform Hajj can be the carriers of several bacteria's. The number of transmission of infectious diseases increases during this large mass gathering [1, 2]. Emerging infections, such as, the Middle East respiratory syndrome coronavirus (MERS-CoV) is one of the most common challenging issues, which Saudi government faces during the Hajj season [3, 4]. The situation is also challenging for pilgrims from other countries, such that, these pilgrims can import epidemic diseases transferred to them during pilgrimage to their homeland. According to a recent study, Australian pilgrims suggests low awareness about preventive measures and the risk of respiratory infections diseases among Hajj pilgrims [5]. However, another study demonstrates that less than half of pilgrims were aware of social distancing and facemask use as precautions against respiratory infections [6]. To this end, it was assumed that the Algerian residents might be at an increased risk for catching acute respiratory diseases.

Diseases, such as, influenza are common health hazards among Hajj pilgrims due to interaction with mass gathering, changing atmosphere and conditions. Since past few years, it has been recommended to the pilgrims to uptake influenza vaccination before leaving for Hajj [7]. The symptoms of the infection can be from mild to severe; thus, causing complication during Hajj pilgrimage. The disease causes epidemic in the entire globe, and is an acute respiratory viral infection that can be controlled and prevented through vaccines. The annual epidemics caused by influenza results in the death of around 250,000- 500,000 million people [8]. People of every age are being subjected to the bacteria of influenza; however, it severely affects older people, pregnant women and children [8]. Due to this realization, the coverage of vaccination have been significantly increased among Hajj pilgrims in the last few years. However, the previous literature still lacks to report on the prevalence of influenza or influenza-like diseases among Hajj pilgrims [7].

In an effort to reduce the risk of infectious diseases at Hajj, the Saudi Arabian Ministry of Health (MoH) recommended group of vaccinations and hygiene measures. The vaccination uptake and compliance are highly variable among pilgrims [9, 10] and the reason behind this variability remains unclear. Therefore, the present study is aimed at evaluating the knowledge, attitude and barriers against vaccinations of Hajj pilgrims. The findings of the study will promote public health and give an idea

regarding the attitude of Algerians towards future mass gathering. Moreover, the study will also help the researchers in developing strategies to cope up with such infections and raising awareness among pilgrims.

## AIMS AND OBJECTIVES:

The study aims to describe the level of knowledge, attitude and barriers regarding seasonal influenza vaccination among Algerian hajj pilgrims in 2016. Furthermore, the study aims to assess the attitude toward seasonal Influenza vaccination among Algerian pilgrims. The study also determines the barriers against acquiring seasonal influenza vaccination among Algerian pilgrims. The relationship between age and attitude toward influenza vaccination among Algerian pilgrims and comparison between different groups of demographics with all variables is assessed.

## RESEARCH QUESTIONS:

**Question 1:** What is the level of knowledge, attitude and barriers regarding seasonal influenza among Algerian pilgrims?

**Question 2:** What are the barriers in acquiring season influenza among Algerian pilgrims?

**Question 3:** What is the relationship between age and attitude of Algerian pilgrims toward influenza vaccination?

**Question 4:** What is the comparison between different demographic groups among Algerian pilgrims?

## MATERIAL AND METHODS:

A cross-sectional survey was conducted on Algerian pilgrims who were the residents of Makah city during 23<sup>rd</sup> August 2016 till 23<sup>rd</sup> September 2016 at the time of Hajj. The survey was conducted on pilgrims who were residents of Makah city. Following a short briefing regarding study, verbal consent was obtained from each participant who agreed to participate in the survey. Moreover, knowledge about Corona virus was assessed by using (KAP) questionnaire. Data about Pilgrims' demographics, previous Hajj attendance and history of chronic medical conditions was collected. Pilgrims were to complete the survey through interviews conducted by the data collection teams. Lastly, ethical approval was obtained from institutional ethical committee of ZMVM volunteering commission ; reference number was HAPO-02-K-012-2017-03- 356.

## Sample Size

A total of 651 subjects were selected for the study from 40,000 population. The inclusion criteria

was based on the Algerian hajj pilgrims, residents of Makah city, and were older than 18 years of age. Lastly, the informed consent of the participants was received. Furthermore, the participants who were not selected for the study were either non-residents of Makah city, non-Algerian Hajj pilgrims, or less than 18 years of age. Those participants who did not give informed consent were also excluded from the study.

#### Statistical Analysis

The collected data was gathered in a single document and rechecked by the researcher to ensure there were no missing, unneeded or mixed data. Statistical analysis results were analyzed by using Statistical Package for the Social science (SPSS) version 23.

#### RESULTS:

Table 1 gives the demographic details of Hajj pilgrims selected for the study. Table 2 shows the information collected on the chronic illnesses among Hajj pilgrims. Such that, 404 participants were found to have no chronic illness (62.1%), 58 participants were found to be suffering from diabetes (8.9%), 92 from HT (14.1%), 4 were suffering from chronic infectious diseases (0.6%), 1 from renal failure (0.2%), 12 from cardiovascular diseases (1.8%), 2 from CNS disorder (0.3%), 1 from skin disease (0.2%), 1 from mobility disorder (0.2%), 5 from GIT diseases (0.8%), and 71 from other illnesses (10.9%).

**Table 1:** Demographic Details

	N	%
<b>Age</b>		
<40	99	15.2
40-50	167	25.7
50-60	140	21.5
>60	245	37.6
<b>Gender</b>		
Male	557	85.6
Female	94	14.4
<b>Hajj</b>		
First time	509	78.2
Second time.	83	12.7
Third time.	22	3.4
More than three.	37	5.7
<b>Education</b>		
No	135	20.7
<12	197	30.3
>12	319	49.0
<b>Residency</b>		
Big City	447	68.7
Small city	139	21.4
Village	60	9.2
Rural	5	.8

**Table 2:** Information regarding Chronic Illness among Hajj pilgrims

Chronic diseases	N	%
No	404	62.1
Diabetes	58	8.9
HT	92	14.1
Chronic Infectious diseases (HIV- Hib)	4	0.6
Renal failure	1	0.2
Cardiovascular diseases	12	1.8
CNS disorder	2	0.3
Skin diseases	1	0.2
Mobility disorder	1	0.2
GIT diseases	5	0.8
Others	71	10.9

Table 3 gives information regarding the symptoms of influenza among Hajj pilgrims. The information showed that almost 273 (41.9%) of the participants suffered from pain, 283 (43.5%) with

fever, 212 (32.6%) from pain muscle, 147 (22.6%) from headache, 83 (12.7%) from sore throat, and 85 (13.1%) from cough.

**Table 3:** Symptoms of Influenza among pilgrims

	N	%
Pain	273	41.9
Fever	283	43.5
Pain muscle	212	32.6
Headache	147	22.6
Sore throat	83	12.7
Cough	85	13.1

Table 4 shows the information regarding the route of influenza vaccine. The information presented that intranasal, injection and oral were found to be

three routes for the administration of influenza vaccine with 1.5%, 91.6% and 4.8%, respectively.

**Table 4:** Information regarding the route of Influenza vaccine

	N	%
Which of the following considered as the route of administration of influenza vaccine?		
Administration Intranasal	10	1.5
Administration Injection	596	91.6
Administration Oral	31	4.8

Table 5 shows that 609 participants received influenza vaccination; whereas, 42 participants did not received any vaccination. Thus, among participants who received vaccination, 130 received seasonal influenza vaccination, 26 received

monovalent pandemic vaccination, 21 receive meningococcal vaccination, 35 received vaccination other than those mentioned; whereas, 397 did not have any knowledge regarding their vaccination.

**Table 5:** Information regarding vaccination of Influenza

	N	%
Have you received vaccination?		
Yes	609	93.5
No	42	6.5
If yes, what are the names of vaccinations?		
Monovalent pandemic vaccination	26	4.3
Seasonal influenza vaccination.	130	21.3
Meningococcal vaccination	21	3.4

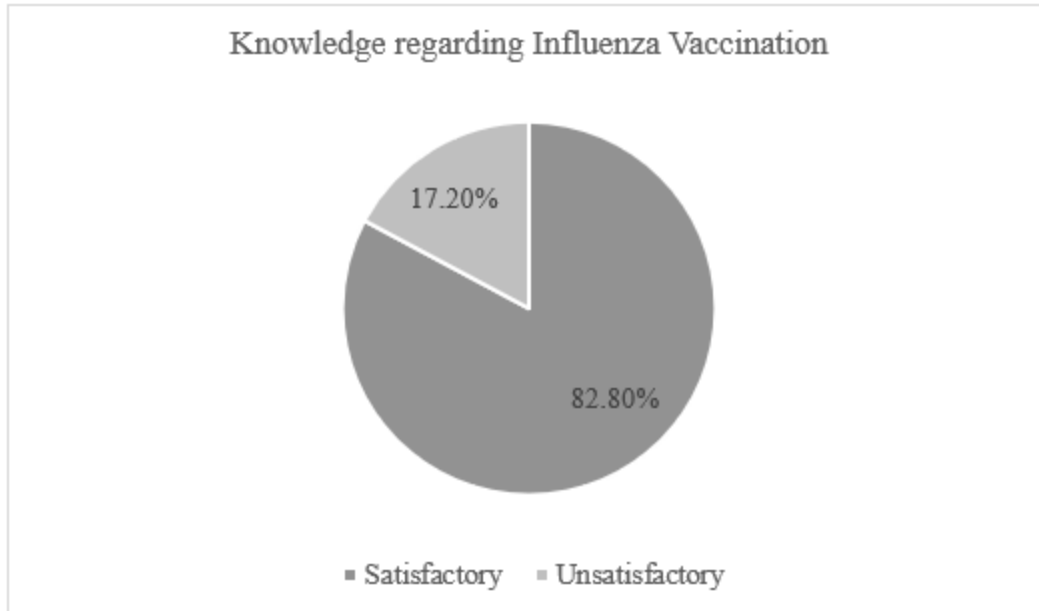
I don't know	397	65.2
Others	35	5.7
If yes, where did you receive your vaccination?		
General practitioners (GPs)	99	16.3
From hospitals	491	80.6
At workplace	10	1.6
At other places	3	0.5
No idea	6	1.0

Table 6 shows the reason behind the decision of pilgrims to uptake influenza vaccination. Out of selected participants, 199 pilgrims reported that it was recommended by their Hajj tour group, 22 pilgrims reported their concern towards flu, 11 pilgrims reported that their doctor recommended it, 3 pilgrims reported that it was recommended by a friend, 13 pilgrims reported that they up took the vaccination to protect their family from it, 10 pilgrims reported that it was offered at their

workplace, 346 pilgrims reported because they were travelling for Hajj; whereas, 5 pilgrims reported that they considered themselves at risk. On the other hand, those participants who did not take vaccination reported their reliance on natural immunity, their belief that they rarely get influenza, too busy to uptake vaccination, lack of awareness regarding flu vaccine, and non-likeness toward injections. Figure 1 shows the level of knowledge regarding influenza vaccine among pilgrims.

**Table 6:** Information on reasons behind taking vaccination

	N	%
What is the reason for being vaccinated?		
Recommended by Hajj tour Group	199	32.7
Because flu is a serious disease	22	3.6
Recommended by doctor	11	1.8
Recommended by a friend	3	.5
To protect family	13	2.1
Vaccine is offered at workplace	10	1.6
Considering themselves "at-risk"	5	.8
Because of travel to Hajj	346	56.8
If not, what is the reasons for not receiving the vaccine?		
Reliance on natural Immunity	4	9.1
Believing that they rarely get influenza	1	2.3
Too busy to get the vaccine	1	2.3
Not aware of the availability of flu vaccine	3	6.8
Do not like injections	35	79.5



**Figure 1:** Knowledge regarding Influenza vaccination

Table 7 presents information on the knowledge regarding influenza vaccine among pilgrims. The results show that 214 participants who were less than 60 years have unsatisfactory knowledge regarding the vaccination; whereas, only 31 participants have satisfactory knowledge. A total of 465 of the male participants and 74 female participants had unsatisfactory knowledge. On the other hand, only 92 males and 20 females had satisfactory level of

knowledge regarding influenza vaccination. A total of 421 participants who were performing Hajj for the first time had unsatisfactory level of knowledge and only 88 participants had satisfactory knowledge regarding influenza. Lastly, 256 participants who completed less than 12 years of education had unsatisfactory knowledge. The p-value for age, gender, Hajj attendance, and education were 0.113, 0.269, 0.813, and 0.110, respectively.

**Table 7:** Knowledge regarding vaccination of Influenza

		Knowledge						Chi-square	
		Unsatisfactory		Satisfactory		Total		X <sup>2</sup>	P-value
		N	%	N	%	N	%		
Age	<40	79	14.7%	20	17.9%	99	15.2%	5.980	0.113
	40-50	133	24.7%	34	30.4%	167	25.7%		
	50-60	113	21.0%	27	24.1%	140	21.5%		
	>60	214	39.7%	31	27.7%	245	37.6%		
Gender	Male	465	86.3%	92	82.1%	557	85.6%	1.220	0.269
	Female	74	13.7%	20	17.9%	94	14.4%		
Hajj Attendance	First time	421	78.1%	88	78.6%	509	78.2%	0.953	0.813
	Second time.	71	13.2%	12	10.7%	83	12.7%		
	Third time.	18	3.3%	4	3.6%	22	3.4%		
	More	29	5.4%	8	7.1%	37	5.7%		

	than three.								
Education	No	119	22.1%	16	14.3%	135	20.7%	4.410	0.110
	<12	164	30.4%	33	29.5%	197	30.3%		
	>12	256	47.5%	63	56.3%	319	49.0%		

### DISCUSSION:

There is a low level of awareness and knowledge among pilgrims regarding the vaccination of influenza. Moreover, there are very few resources available that gives the knowledge of influenza. Lastly, even those participants who were educated consisted of low level of knowledge regarding influenza vaccination. Thus, insignificant relationship exist between knowledge of influenza vaccination and education level.

Contrary to it, the results of the study conducted by Althobaity et al. [11] concluded that Saudi pilgrims relatively had good knowledge regarding MERS-CoV. The results of the study showed statistical significance among Saudi pilgrims as compared to non-Saudi pilgrims. However, the Saudi pilgrims were not aware of the preventive measures and efficient vaccination of MERS-CoV. Such that, Saudi pilgrims only consisted knowledge regarding the signs, transference, risk groups, screening, causative agents, and severity of MERS-CoV. The study was found to be significant in evaluating the awareness regarding MERS-CoV among Saudi pilgrims. The study recommended to enhance the knowledge of MERS-CoV among non-Saudi pilgrims to acknowledge them regarding severity of disease.

Also, the results of the study were found to be inconsistent with the study conducted by Pavli et al. [12]. The study was conducted on the Greek students who were traveling abroad for further studies. The study evaluated the knowledge and awareness regarding Meningococcal disease and its vaccination. The results of the study predicted a good level of knowledge regarding the disease and its vaccination among pilgrims. On the other hand, the knowledge was associated with the vaccine uptake of meningococcal. Despite of the good level of knowledge among Greek students, the rate of vaccination was found to be low.

Alfelali et al. [13] conducted a study to evaluate the influenza vaccination among Saudi Hajj pilgrims, thus, revealing the vaccination barriers and its uptake. The results of the study showed that the vaccination rates were 21.4%, 48.2% and 58.1% for year 2013, 2014 and 2015, respectively. Only 54.5% of the pilgrims received the vaccination, and the lack of awareness was found to be 47.5%. On the other hand, the reasons mentioned for no uptake of vaccination

were being busy and reliance on natural immunity by participants. Thus, the results showed that the rate of vaccination is increasing among Saudi pilgrims; however, there is still a need to improve the awareness level among pilgrims.

Another study conducted by Barasheed et al. [14] concluded satisfactory level of vaccine uptake among Australian pilgrims. The results of the study suggested that the reasons for not receiving vaccination included; they rarely catch influenza and reliance on natural immunity. Mostly participants took vaccination on recommendation of their tour group leader. Such that, the results showed that the participants had misconceptions regarding vaccination; however, the tour operators played a significant role in spreading knowledge regarding vaccination.

The risk of catching respiratory diseases is high during the time of mass gatherings, such as, Hajj. Therefore, it has become a necessity for pilgrims to take vaccinations for influenza and other communicable diseases. The following study concluded that there was a low level of knowledge among Algerian pilgrims who were the residents of Makah city. Moreover, the relationship between education level and influenza vaccination was also insignificant. There were very small number of resources present to spread the awareness regarding influenza vaccination. There is a need to improve the level of awareness and knowledge regarding influenza vaccination among Algerian Hajj pilgrims. Several limitations have been mentioned in the study despite of its significance. The study included small number of participants; therefore, future studies are recommended to include a large sample size to conclude generalized results. The focus of the study was limited to Algerian population; thus, future studies must include sample from overall Hajj pilgrims to evaluate the knowledge regarding a particular disease. The prevalence of influenza among Hajj pilgrims was not evaluated, such that, future studies are recommended to include the prevalence of influenza as well as its causative signs.

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